

L18 ANSWER 1 OF 3 CAPLUS COPYRIGHT 2004 ACS on STN  
 AN 2003:433089 CAPLUS  
 DN 139:16065  
 ED Entered STN: 06 Jun 2003  
 TI Manufacture of porous silica electric insulator thin-films  
 IN Shirataki, Hironobu; Hanahata, Hiroyuki  
 PA Asahi Kasei Corporation, Japan  
 SO Jpn. Kokai Tokkyo Koho, 18 pp.  
 CODEN: JKXXAF  
 DT Patent  
 LA Japanese  
 IC ICM H01L021-312  
 ICS C08J005-18; C08K005-5415; C08L083-06; C08L101-00; H01L021-316;  
 H01L021-768  
 CC 76-10 (Electric Phenomena)  
 Section cross-reference(s): 57  
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2003163210	A2	20030606	JP 2001-362721	20011128 <--
PRAI JP 2001-362721		20011128		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2003163210	ICM	H01L021-312
	ICS	C08J005-18; C08K005-5415; C08L083-06; C08L101-00; H01L021-316; H01L021-768

OS MARPAT 139:16065  
 AB The title manufacture involves (1) twice-coating on a substrate with an insulative coating material containing an organic polymer binder, a solvent, and a silica-precursor chosen from a desired alkoxy silane, a hydrolyzed alkoxy silane, and an alkoxy silane polycondensate, (2) gelating the silica-precursor to give a silica/organic-polymer composite film, and (3) removing the organic polymer out of the coated and gelated thin film pattern. The prepared porous silica thin film has a low dielec. constant and a sufficient mech. strength against CMP in Cu circuit patterning in semiconductor device fabrication.  
 ST porous silica thin film insulator manuf precursor coating gelation  
 IT Silanes  
 RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
 (alkoxy, silica precursor; manufacture of porous silica elec. insulator thin-films by gelation of silica-precursor)  
 IT Dielectric constant  
 (low, for porous silica thin film; manufacture of porous silica elec. insulator thin-films by gelation of silica-precursor)  
 IT Semiconductor device fabrication  
 (manufacture of porous silica elec. insulator thin-films by gelation of silica-precursor)  
 IT Gelation  
 (of silica-precursor paste; manufacture of porous silica elec. insulator thin-films by gelation of silica-precursor)  
 IT Tensile strength  
 (porous silica insulator pattern; manufacture of porous silica elec. insulator thin-films by gelation of silica-precursor)  
 IT Electric insulators  
 (porous silica thin film; manufacture of porous silica elec. insulator thin-films by gelation of silica-precursor)  
 IT Porous materials  
 (silica thin film; manufacture of porous silica elec. insulator thin-films by gelation of silica-precursor)  
 IT Coating materials

(silica-precursor paste; manufacture of porous silica elec. insulator thin-films by gelation of silica-precursor)

IT 9003-11-6, Ethylene glycol-propylene glycol copolymer  
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)  
(binder; manufacture of porous silica elec. insulator thin-films by gelation of silica-precursor)

IT 110-71-4, Ethylene glycol dimethyl ether  
RL: MOA (Modifier or additive use); USES (Uses)  
(manufacture of porous silica elec. insulator thin-films by gelation of silica-precursor)

IT 7631-86-9P, Silica, properties  
RL: DEV (Device component use); PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation); USES (Uses)  
(porous, thin film, fabrication of; manufacture of porous silica elec. insulator thin-films by gelation of silica-precursor)

IT 78-10-4, Tetraethoxysilane 78-62-6, Dimethyldiethoxysilane 2031-67-6,  
Methyltriethoxysilane 16068-37-4, Bistriethoxysilyl ethane  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(silica-precursor; manufacture of porous silica elec. insulator thin-films by gelation of silica-precursor)

RN 9003-11-6  
RN 110-71-4  
RN 7631-86-9P  
RN 78-10-4  
RN 78-62-6  
RN 2031-67-6  
RN 16068-37-4

L18 ANSWER 2 OF 3 WPIX COPYRIGHT 2004 THE THOMSON CORP on STN  
AN 2003-818851 [77] WPIX  
DNN N2003-655205 DNC C2003-229577  
TI Manufacture of insulation film for semiconductor material, involves applying specific composition on base material, reapplying composition after removing solvent in coating film, and removing component from film.  
DC A26 A85 G02 L03 U11  
PA (ASAHI) ASAHI KASEI KK  
CYC 1  
PI JP 2003163210 A 20030606 (200377)\* 18 H01L021-312 <--  
ADT JP 2003163210 A JP 2001-362721 20011128  
PRAI JP 2001-362721 20011128  
IC ICM H01L021-312  
ICS C08J005-18; C08K005-5415; C08L083-06; C08L101-00; H01L021-316;  
H01L021-768  
AB JP2003163210 A UPAB: 20031128

NOVELTY - The composition containing solvent and specific components (A,B) is applied to a base material surface to form coating film. The composition containing solvent is reapplied after removing the solvent in the film. The solvent is removed in a film to 10-99 weight% or less before and after processing. The component (B) is removed after hardening component (A) from the film to form an insulation film.

DETAILED DESCRIPTION - The application composition containing electrically insulating inorganic or organic component (A), the substance which volatilize and generate gas at 0-500 deg. C (B) and organic solvent (C) is applied on a base material surface to form coating film. The application composition is reapplied after removing the solvent in 10-99 weight% in the coating film by before and after processing. The component (B) is removed from the coating film after hardening the component (A) to form an insulation film. INDEPENDENT CLAIMS are included for the following:

- (1) wiring structure; and
- (2) semiconductor component.

USE - For semiconductor material component such as wiring structure (claimed).

ADVANTAGE - The manufacturing method enables to produce insulation film having low dielectric constant and high mechanical strength and

endures sufficiently the chemical-mechanical polishing process in copper wiring process of semiconductor components.

Dwg.0/0

FS CPI EPI

FA AB

MC CPI: A08-S02; A12-E07C; G02-A05A; L04-C12

EPI: U11-C05A; U11-C05B7; U11-C05D

L18 ANSWER 3 OF 3 JAPIO (C) 2004 JPO on STN

AN 2003-163210 JAPIO

TI MANUFACTURING METHOD FOR INSULATION THIN FILM

IN SHIRATAKI HIRONOBU; HANABATAKE HIROYUKI

PA ASAHI KASEI CORP

PI JP 2003163210 A 20030606 Heisei

AI JP 2001-362721 (JP2001362721 Heisei) 20011128

PRAI JP 2001-362721 20011128

SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2003

IC ICM H01L021-312

ICS C08J005-18; C08K005-5415; C08L083-06; C08L101-00; H01L021-316;  
H01L021-768

AB PROBLEM TO BE SOLVED: To provide a method for manufacturing a porous silica thin film having mechanical strength sufficiently enduring a CMP process in a copper wiring process of a semiconductor element by having a low dielectric constant of the porous silica thin film.

SOLUTION: In the manufacturing method of the porous silica thin film, a silica precursor is gelled after applying an application composition for an insulation thin film containing the silica precursor containing at least a kind or more of compounds selected from specific structural alkoxy silane, its hydrolyte and condensation polymer, an organic polymer and a solvent on a substrate two times in a specific condition, silica/the organic polymer composite are film-formed, and thereafter the organic polymer is removed from the thin film.

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